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EXAMINER

HAMILTON, CYNTHIA

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,407

Applicant(s)

LIU ET AL.

Examiner

Cynthia Hamilton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/23/04, 10/15/04, 1/3/05, 6/15/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-96 is/are pending in the application.
- 4a) Of the above claim(s) 1-42 and 84-96 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 67-69 is/are allowed.
- 6) ☒ Claim(s) 43-66 and 70-83 is/are rejected.
- 7) ☒ Claim(s) 46, 53, 61, 66, 72, 73 and 76 is/are objected to.
- 8) ☒ Claim(s) 1-96 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2005/1015</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's election with traverse of Group VI, claims 43-83 in the reply filed on June 15, 2005 is acknowledged. The traversal is on the ground(s) that Groups I through X can be examined together, that Groups I-X are related and that a proper search of the claims of one group should by necessity, require a proper search of claims of other groups, that "any nominal burden placed upon the examiner to search accordingly to determine the art relevant to applicant's overall invention is significantly outweighed by the public's interest in not having to obtain and study many separate patents in order to have available all of the issued patent claims covering applicant's invention", and the alternative would place an "... an unnecessary burden on both the Patent and Trademark Office and on the Applicants." Applicants also argue that the examiner did not need to restrict the application and for the interest of economy, for the Office, for the public-at-large, and for Applicants, reconsideration and withdrawal of the restriction requirement are requested. This is not found persuasive because applicants did not point out any errors in the restriction requirement made by this examiner. The search for the elected invention alone in the mandatory class 430, subclass 270.1 encompasses over 4,000 US documents. This is not considering the search for just the monomers, the polymers, the methods of making the monomers, the methods of making intermediates used to make the monomers or the required searches of non patent literature and foreign patent literature. There is also the issue of independent claims for non overlapping monomers being presented. Class 560, subclass 288 has another 288 documents of which only 7 overlap Class 430/270.1. This does not take into account the polymer classes. Applicants presented over 150 claims and 17 independent claims when multiple dependencies are considered. The examiner has tried to reduce the burden upon

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herself which is the proper and right second reason for a restriction to be made. The examiner without restriction could not begin to do the examination of these claims full justice.

The requirement is still deemed proper and is therefore made FINAL.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 46, 53, 61 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 46, last three lines, applicants define R_4 as selected from the group consisting of H, an alkyl group having from 1 to 4 carbon atoms, and an alkoxy group having from 1 to 4 carbon atoms. Claim 46 is dependent upon claim 44 that is dependent upon claim 43. In claim 43, R_4 is defined as $-CH_3$ or $-C_2H_5$. Since two separate sets of structure set forth R_4 , the examiner is unsure whether applicants are changing the definition of R_4 in claim 43 or meant to use a completely different variable for that described as R_4 in claim 46. Perhaps Applicants meant R_5 ? This double use of R_4 is either confusing because a variable is used twice in claim 46 with different limits, or applicants are broadening the scope of the polymer set forth in independent claim 43. If it is the first, the examiner holds the use of the same variable in claim 43 for two different sets of limits as confusing. The same problem exists in claim 53 with respect to independent claim 47 and in claim 61 with respect to claim 54 and in claim 66 with respect to claim 62.

4. Claims 46 and 53 and 61 and 66 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper

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dependent form, or rewrite the claim(s) in independent form. In view of the broadening of the scope of R₄ in claim 46 over that set forth in claim 43, claim 46 is objected to. See preceding paragraph for problem in claim 46 with scope change for R₄.

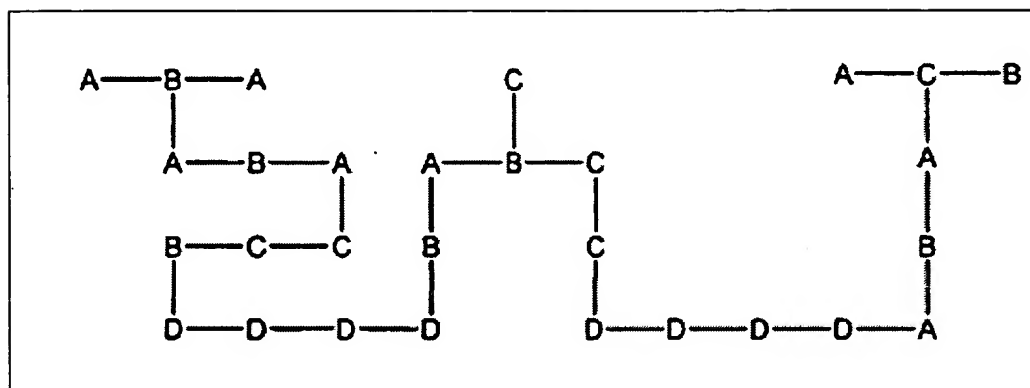
5. Claims 63 and 64 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims depend upon claim 62. Claim 62 has no c therefore there is no clear antecedent basis for the limits of c set forth in claims 64 and 65. This makes the limits of the claimed invention unclear in claims 63-64.

6. Claim 72 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner believes applicants left out part of claim 72. The claim ends with "comprises" and no period. Examination is possible but the composition reads on all positive-acting photoresist compositions with a base resin. The claim is found confusing because of the vague ending.

7. Claim 72 is objected to because of the following informalities: There is no period at the end of claim 72. Appropriate correction is required.

8. Claim 76 is objected to because of the following informalities: In line 2, "o-nitorbenzyl" should be --- nitrobenzyl ---. Appropriate correction is required.

9. Claim 83 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 83 dependent upon 43, 47, 54, 62, 67 or 71 limits the base resin to a block co-polymer represented by the general formula:



Only D is defined in claim 83. There is no definition of A, C or B in any of claims 43, 47, 54, 62, 67 or 71. The variables a, b, c, d and e are used for the amount of a mer present in the base resins but no A, B or C is found. Thus, what is meant by the block co-polymer set forth in claim 83 to any of the base resins in claims 43, 47, 54, 62, 67 or 71 is unclear. Claim 62 has only two differing mers set forth, one of which is a lactone. What is meant here is unknown by this examiner beyond a particular structure with repeating D units as defined and differing repeating units for C, B and A. Where the mers of claims 43, 47, 54, 62, 67 or 71 fall within this block copolymer is unclear.

10. Claims 62-66, and 73/62, 74/62, 75/62, 76/75/62, 77/75/72, 78/75/62, 79/75/62, 80/75/62, 81/75/62, 82/79/75/62, and 83/75/62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no clear antecedent basis for R_3 defined in claim 62. Thus, it is unclear what is being limited by R_3 . For examination purposes with respect to claim 62 and those dependent thereon, the examiner has ignored R_3 because she does not know to which it refers.

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11. Claims 81-82 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 81 and 82 reference "the developing solution for the composition" with respect to the photoresist composition of claims 43, 47, 54, 62, 67 or 71. None of claims 43, 47, 54, 62, 67 or 71 reference a developing solution of any kind. Since photoresists are not limited to wet development but can be developed by absorption, laser ablation or plasma etching not to mention reaction with further components in an imaged or unimaged region to allow differences. Thus, there is no clear understanding in reading claims 43, 47, 54, 62, 67 or 71 that any developing solution is required for the photoresists formed. There is also no clear antecedent basis for "the developing solution" referenced in claims 81-82. The only assumption for examining purposes the examiner can make is the photoresists must inherently in some way be developable with the solutions set forth. However, as the wording now stands, the limits of claims 81-82 are unclear.

12. Claims 73/43, 73/47, 73/54, and 73/62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 73 recites the limitation "any of the diamondoid containing monomers" in line 2. There is insufficient antecedent basis for this limitation in the claims 43, 47, 54 and 62 when claim 73 depends upon them. No monomer is cited in claims 43, 47, 54 and 62.

13. Claim 51 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

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the invention. There is no clear antecedent basis for 3b or 2b limited in claim 51. Thus, the limits of claim 51 are unclear.

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claims 47-50, 72, 73/54, 74/54, 75/47, 77/75/47, 78/75/47, 80/47, and 81/47 are rejected under 35 U.S.C. 102(b) as being anticipated by Hada et al (6,087,063). With respect to applicant's claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 80/47, and 81/47, the photoresist solution of Example 2 of Hada et al anticipates the instant compositions wherein $a=0.5$, $b=0.5$, $c=0$, $d=0$, $R1=-CH_3$, $R2=CH_3$, and $P1=lactone$. "A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989). In Hada et al, see particularly copolymer A2 in Column 1, and Examples 1 and 2. With respect to instant claims 73/47, and 74/47, the adamantane monomer of Hada et al inherently has an Ohichi number

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“greater than about 3” and the average value of the solubility parameter of the base resin is within the range from 8 to 13 $\text{cal}^{0.5}/\text{cm}^{1.5}$.

16. Claims 54-58, 60-61, 72, 73/54, 74/54, 75/54, 77/75/54, 78/75/54, 80/54, and 81/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Hada et al (6,087,063). With respect to applicant's claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 80/54, and 81/54 the photoresist solution of Example 2 of Hada et al anticipates the instant compositions wherein $a=0.5$, $b=0.5$, $c=0$, $d=0$, $R1=-\text{CH}_3$, $R2=\text{CH}_3$, and $P1=\text{lactone}$. “A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus.” The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989). In Hada et al, see particularly copolymer A2 in Column 1, and Examples 1 and 2. With respect to instant claims 73/54, and 74/54, the adamantane monomer of Hada et al inherently has an Ohichi number “greater than about 3” and the average value of the solubility parameter of the base resin is within the range from 8 to 13 $\text{cal}^{0.5}/\text{cm}^{1.5}$.

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hada et al (6,087,063). As disclosed

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by this examiner in the previous rejections over Hada et al, the Example 2 photoresist composition of Hada et al anticipates the instant invention. However, this is only one species of the genus disclosed by Hada et al. The use of other lactone monomers to form photoresists with the adamantane monomer of copolymer 2 would have been prima facie obvious in view of the disclosure of other units for formula (1) in col. 3-4 as would the use of the preferred range of from 0.4 to 0.7 by moles, i.e. 40% to 70% of the lactone as set forth in lines 53-68 in col. 4 of Hada et al. With respect to instant claims 75/47, 75/54, 79/47, 79/54, 82/79/47 and 82/79/54, the use of the optional additives and other solvents set forth by Hada et al with the copolymers of Example 2 would also have been prima facie obvious to obtain a positive-working photoresist having high transparency at the wavelength of the ArF excimer laser beam as well suitable for puddle development and capable of aqueous alkaline development with high resistance against dry etching and good adhesion to the substrate as set forth in the first paragraph in col. 1. See particularly in Hada et al, Summary of the Invention, col. 5, lines 7-68, col. 8, lines 37-col. 10, lines 13. Some of the optional components and solvents from Hada et al are set forth below:

"It is of course optional that the inventive photoresist composition can be admixed according to need, besides the above described essential components (A) and (B), with various kinds of known additives conventionally used in photoresist compositions including halation inhibitors, antioxidants, heat stabilizers, adhesion improvers, plasticizers, coloring agents, surface active agents, auxiliary resins, carboxylic acids, amine compounds and the like each in a limited amount.

The positive-working photoresist composition of the invention is used usually in the form of a uniform solution prepared by dissolving the above described essential and optional ingredients in a suitable organic solvent. Examples of suitable organic solvents include ketone solvents such as acetone, methyl ethyl ketone, cyclohexanone, methyl isoamyl ketone and 2-heptanone, polyhydric alcohols and derivatives thereof such as ethyleneglycol, ethyleneglycol monoacetate, diethyleneglycol, diethyleneglycol monoacetate, propyleneglycol, propyleneglycol monoacetate, dipropyleneglycol and dipropyleneglycol monoacetate as well as monomethyl, monoethyl, monopropyl, monobutyl and monophenyl ethers thereof, cyclic ethers such as dioxane, and ester solvents such as methyl lactate, ethyl lactate, methyl acetate, ethyl acetate, butyl acetate, methyl pyruvate, ethyl pyruvate, methyl methoxypropionate and ethyl ethoxypropionate. These organic solvents can be used either singly or as a mixture of two kinds or more according to need."

This section was taken from the text on of Hada et al in col. 9 and 10.

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19. Claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54 rejected under 35 U.S.C. 102(b) as being anticipated by Padmanaban et al (US 6,115,085). With respect to instant claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54, the composition of Padmanaban et al set forth below found in Example 1 anticipates the instant compositions. The passage of most interest is as follows:

" The photoresist used for coating on top of the antireflective coating of this invention was formulated with 3.311 g of a copolymer of mevalonic lactone methacrylate and 2-methyladamantyl methacrylate, 0.1361 g of diphenyliodonium nonafluoro-1-butanesulfonate, 0.00265 g of piperidine ethanol and 20 g of ethyl lactate. The solution was filtered with 0.45 and 0.2 μm filters. 500 nm thick photoresist solution was coated and baked at 115.degree. C. for 60 seconds. The wafer was then imagewise exposed using a 193 nm exposure tool. The exposed wafer was baked at 110.degree. C. for 60 seconds and developed using a 2.38 wt % aqueous solution of tetramethyl ammonium hydroxide for 60 seconds. "

Piperidine ethanol is an organic base compound and the iodonium compound is the photoacid generator and ethyl lactate is the solvent. With respect to instant claims 73/54, 73/47, 74/47 and 74/54, the adamantane monomer of Padmanaban et al et al inherently has an Ohnishi number "greater than about 3" and the average value of the solubility parameter of the base resin is within the range from 8 to 13 $\text{cal}^{0.5}/\text{cm}^{1.5}$.

20. The examiner notes for the record that the photoacid generator of claim 76 with an 0-nitrobenzyl type protecting group is one of those listed in claim 75 as the photoacid generator selection.

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21. Claim 73 is objected to because of the following informalities: "Onichi" should be -- Ohnishi --. See page 36 of instant specification. Appropriate correction is required.

22. Claims 47-50, 54-58, 60-61, 72, 73/47, 73/54, 74/47, 74/54, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 80/47, 80/54, 81/47, and 81/54 and rejected under 35

U.S.C. 102(b) as being anticipated by Takechi et al (US 2001/0003640). With respect to instant claims 47-50, 54-58, 60-61, 72, 73/47, 73/54, 74/47, 74/54, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 80/47, 80/54, 81/47, and 81/54, the polymers and compositions of Examples 8, 10, 12-29, 66-67 and 107-112 of Takechi et al anticipate the instant compositions wherein $b > 0$. The polymers in these examples inherently have Ohnishi number "greater than about 3" and the average value of the solubility parameter of the base resin is within the range from 8 to $13 \text{ cal}^{0.5}/\text{cm}^{1.5}$.

23. Claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54 rejected under 35 U.S.C. 102(b) as being anticipated by Uetani et al (US 2001/0014428 A1). With respect to instant claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54, the compositions of Uetani et al in their entirety anticipate the instant compositions wherein instant $b > 0$.

24. Claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47 and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54 rejected under 35 U.S.C. 102(b) as being anticipated by Nakanishi et al (US 2001/0016298 A1). With respect to instant claims 47-50, 72, 75/47, 77/75/47, 78/75/47, 79/43, 80/47, 81/47, and 82/79/47

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and claims 54-58, 60-61, 72, 75/54, 77/75/54, 78/75/54, 79/54, 80/54, 81/54 and 82/79/54, the compositions of Nakanishi et al in their entirety anticipate the instant compositions wherein instant $b > 0$. In Nakanishi et al, take special note of [0032-0096] for additives beyond the required adamantyl polymer. The solvents listed by Nakanishi et al are as follows:

[0095] The resist composition of the present invention generally becomes a resist solution in the state in which the above-described components are dissolved in a solvent to be applied on a substrate such as a silicon wafer. The solvent herein used may be one which dissolves each component, has an appropriate drying rate, and provides a uniform and smooth coating after evaporation of the solvent, and can be one which is generally used in this field. Examples thereof include glycol ether esters such as ethylcellosolve acetate, methylcellosolve acetate, and propylene glycol monomethyl ether acetate; esters such as ethyl lactate, butyl acetate, amyl acetate, and ethyl pyruvate; ketones such as acetone, methyl isobutyl ketone, 2-heptanone, and cyclohexanone; and cyclic esters such as γ -butyrolactone. These solvents can be used alone or in combination of two or more thereof.

The examiner notes that nitrobenzyl p-toulenesulfonates are listed as photoacid generators but there is no listing of these compounds being part of any of the required instant parts found in instant claim 75 from which instant claim 76 depends.

25. Claims 47-50, 52-58, 60-61, 72, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/54, 78/75/47, 80/47, 80/54, 81/47 and 81/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Nozaki et al (6,013,416). With respect to instant claims 47-50, 52-58, 60-61, 72, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/54, 78/75/47, 80/47, 80/54, 81/47 and 81/54, Examples 8-19 and 23-27 of Nozaki et al anticipate the instant "positive-working photoresist compositions" wherein $c=d=0$, i.e. an adamantyl pendant group is present but no larger diamondoid groups such as diamantyl are present, and $R_3=H$. The solvents used were cyclohexanone, gamma butyrolactone, propylene glycol monomethyl ether acetate and ethyl lactate.

26. Claims 80/47 and 80/54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nozaki et al (6,013,416). With respect to instant claims 80/47 and 80/54, Examples 8-19 and 23-27 of Nozaki et al disclose the instant "positive-working photoresist compositions wherein

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$c=d=0$. and $R_3=H$ with the exception of specific solvents in instant claims 80/47 and 80/54. In col. 36, lines 17-46, the use of the following solvents to make up their photoresist compositions is set forth.

Ethyl lactate

Methyl-3-methoxypropionate,

Ethyl 3 ethoxypropionate,

Propyleneglycol methyletheracetate, i.e. propylene glycol monomethyl ether acetate,

Cyclohexanone,

Ethyl pyruvate, i.e. ethyl pyruvate,

Butyl acetate,

Gamma-butyrolactone, i.e. gamma butyrolactone.

With respect to instant claims 80/47 and 80/54, the use of any of the disclosed suitable solvent of Nozaki et al with their photoresist compositions would have been prima facie obvious to obtain the appropriate coating thickness, viscosity, solvency, etc as set forth in col. 36.

27. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

28. Claims 1-42 and 84-96 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on June 15, 2005.

29. The examiner notes that applicants point to the meaning of “positive acting” in last full paragraph on page 2 of their specification. The paragraph is as follows with the point of emphasis in bold type:

*In general, a photoresist composition comprises at least a resin binder and a photoactive agent. The "chemically amplified" resists in use today were developed for the formation of sub-micron images and other high performance applications. They may be either positive or negative acting. **In the case of a positive acting resist, the regions that are exposed to the radiation become more soluble in the developer, while those areas that are not exposed remain comparatively less soluble in the developer.** Cationic initiators are used to induce cleavage of certain "blocking groups" pendant from the photoresist binder resin, or cleavage of certain groups that comprise a photoresist binder backbone. Upon cleavage of the blocking group through exposure of a layer of photoresist to light, a base soluble functional group is formed, such as a carboxylic acid or an imide, which results in a different solubility in the developer for the exposed and unexposed regions of the resist layer.*

The examiner notes that this is not a clear defining of “positive working” as used in the claim language. However, it does point to the meaning of positive resist and the properties required of the positive resist. With respect to “positive working”, the examiner has examined the claims as limited by the members of the composition set forth. The use of “positive-working photoresist composition has been taken to mean that the composition could be used for making a photoresist which when the regions are exposed to radiation that they become more soluble in a developer

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than the unexposed areas. There is no limitation to a particular developer. The examiner has taken into consideration organic solvents, aqueous solvents, aqueous base solvents, etc.

30. The disclosure is objected to because of the following informalities: On page 10, starting at line 24, applicants define “diamondoids” are inclusive of adamantane, diamantane, triamantane etc.. At line 31 of page 10, the following is given, “Diamondoids” include “lower diamondoids” and “diamondoids”. On the top of page 11, “lower diamondoids” references adamantane, diamantane and triamantane along with substituted derivatives, the “diamondoids” are defined as starting with tetramantane and progressing undecamantane. This is confusing. Did applicants mean to use the more common “higher diamondoid” which appears in claim 54 as “higher diamondoid” in the general formula? The meaning of “diamondoid” is confused by this double definition in the specification. Please make clear what is intended here.

Appropriate correction is required.

31. The examiner notes for the record the only support found in the disclosure for “heterodiamondoid” found in claim 70 is the following at page 7, lines 14-22:

According to other embodiments of the present invention, the diamondoid pendant groups of the base resin may contain lactone groups, and they may be linked to the main polymer chain by more than one ester linking group, thereby providing multiple sites on which the photo-generated acid can react. This has advantages of allowing either weaker acids, lower post exposure bake temperatures, and a greater variety of photo-acid generators from which to choose. The diamondoid pendant groups may contain hetero atoms in addition to the oxygen atom of a lactone group. The hetero atoms may be selected from the group of O, N, B, S, and/or P. Block co-polymers are also contemplated.

32. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the

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following is required: The structures of claim 71 are not found in the original specification. Since claim 71 is an original claim this can be fixed by amending the specification to contain claim 71.

33. Claims 47-50, 52-58, 60-61, 70, 72, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 81/47, 81/54, 82/47 and 82/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Okino et al (6,303,266 B1). With respect to instant claim 70, the resins of Okino et al set forth in col. 78, starting in line 42 through col. 81, line 35, and the compositions starting at line 63 of col. 82, anticipate the instant invention wherein the lactone diamondoid ring system is the heterodiamonoid. Since the lactone ring is the only actual species of a heterocyclic that appeared to be a "heterodiamonoid", the examiner has assumed it is such a compound. Applicants have not shown how to make the compounds of instant claim 70. With respect to instant claims 47-50, 52-58, 60-61, 72, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 81/47, 81/54, 82/47 and 82/54, the photoresists of Tabel I-1 in col. 42 made from Ex. I08 and I-9 anticipate the instant compositions wherein $b=a-1$.

34. Claims 47-50, 52-58, 60-61, 73/47, 73/54, 74/47, 74/54, 75/47, 75/54, 77/47, 77/54, 78/75/47, 78/75/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoai et al (6,245,485 cited by applicants). With respect to instant claims 47-50, 52-58, 60-61, 73/47, 73/54, 74/47, 74/54, 75/47, 75/54, 77/47, 77/54, 78/75/47, 78/75/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54, the resins of Synthesis Examples 11,12,13, 16 and 17 along with the compositions of Example 1 om table 2 wherein p-6, p-8, and p12 are used anticipate the instant compositions. With respect to instant claims 73/47, 73/54 and 74/47, 74/54, the adamantane monomers of Aoai et al inherently has an Ohichi number

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“greater than about 3” and the average value of the solubility parameter of the base resin is within the range from 8 to 13 $\text{cal}^{0.5}/\text{cm}^{1.5}$.

35. Claims 43-61, 72, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), 80/(43,47,52), 81/(43,47,52), and 82/(43,47,52) are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoai et al (6,245,485 cited by applicants) in view of Liu et al (WO 02/057201 A2). With respect to instant claims 43-61, 72, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), 80/(43,47,52), 81/(43,47,52), and 82/(43,47,52), Aoai et al teach species of the instant invention but for c being greater than zero in the instant resin. What Aoai et al teach is a positive resin composition having a polycyclic alicyclic group and a carboxyl group and a compound generating an acid. The object of Aoai et al is stated to be in col. 3, lines 40-52:

Accordingly, the object of the present invention is to provide a positive resist composition suitable for the exposure using a light source of 220 nm or less, particularly an ArF excimer laser beam (193 nm). More specifically, the object of the present invention is to provide a positive resist composition which ensures, on use of an exposure light source of 220 nm or less, high sensitivity, good resolution, sufficiently high resistance against dry etching, satisfactory adhesion to the substrate, and superior developability even with a developer conventionally used for resists (for example, a 2.38% aqueous tetramethylammonium hydroxide solution).

In col. 5, lines 5-8 of Aoai et al, the positive resist composition is disclosed to be the resin (1) as component (B) further containing a group capable of decomposing by the action of an acid to increase solubility in an alkali developer. In the paragraph bridging col. 3-4, resin (B) is described as having a “polycyclic-type alicyclic group” and a carboxyl group. In col. 10, lines 40-46, the “polycyclic-type alicyclic group” is disclosed as preferably an alicyclic group having 5 or more carbon atoms, which may have a substituent, such as ... a tetracyclo-alicyclic group, more

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preferably having from 6 to 30 carbon atoms, still more preferably from 7 to 25 carbon atoms, which may have a substituent.” Further, working examples of the positive resins of Aoai et al have as (B) resin at col. 87-89, those with adamantane groups. Thus, the smallest diamondoid structure is made of use by Aoai et al with acid degradable units such as in p-6 resin and p-8 resin. These alicyclics in Aoai et al are used over aromatic groups because they are more transparent at the smaller wavelengths used for imaging and have etch resistance like the aromatics thus helping the transparency while keeping the etch resistance. In Aoai et al, see particularly the Abstract, paragraph bridging col. 2-3, col. 3, col. 9, lines 20-34, col. 9, lines 65-68, col. 10, lines 40-46, and col. 19, lines 50-65. With respect to the use of diamantane or triamantane or higher diamondoid resins as resin (B) in Aoai et al, Liu et al teach on page 107, lines 5-19, that the higher diamondoids have etch resistance moieties like the adamantane polymers and would be expected to have even better glass transition temperatures and high deposition temperatures. Thus, with respect to instant claims 43-61, 72, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), 80/(43,47,52), 81/(43,47,52), and 82/(43,47,52), the use of any of the diamondoid family for the “polycyclic-type alicyclic group” in Aoai et al would have been prima facie obvious to obtain even better etch resistance while maintaining the transparency needed. Diamantyl groups have 14 carbon atoms, triamantyl groups have 18 carbon atoms, tetramantanes have 22 carbon atoms, pentamantanes have 26 or 25 carbons and hexamantanes have 26, 29 or 30 carbon atoms as shown by Liu et al in Fig 1.A. Liu et al in Example 73, pages 105-106 discuss the advantages of transparency using their diamondoids. On pages 75-86, Liu et al teach how to form the esters of the diamondoids from dibromonated or mono brominated diamondoids inclusive of acrylated diamondoids. The teachings of Aoai et al

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with respect to adamantyl groups then the higher diamondoids makes prima facie obvious the range from adamantyl through the higher diamondoids would work as transparent etch resistant groups for the chemically amplified positive resists known in the art. With respect to instant claims 75 and 77-78, the compounds taught by Aoai et al to be decomposable to acid on irradiation of an active light ray or radiation are inclusive of all of those set forth starting at the bottom of col. 64 and going to col. 81. With respect to instant claim 79, in col. 81, starting in line 23, Aoai et al teach the optional use of acid decomposable dissolution inhibiting compounds, dyes, plasticizer, surface active agent, photosensitizer, organic basic compound and a compound which accelerates the solubility of the developers. With respect to instant claim 80, the solvents taught by Aoai et al for their photoresists are set forth in col. 84, lines 7-20 and are as follows: ethylene dichloride, cyclohexanone, cyclopentanone, 2-heptanone, gamma-butyrolactone, methyl ethyl ketone, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, 2-methoxyethyl acetate, ethylene glycol monoethyl ether acetate, propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate, toluene, ethyl acetate, methyl lactate, ethyl lactate, methyl methoxypropionate, ethyl ethoxypropionate, methyl pyruvate, ethyl pyruvate, propyl pyruvate, N,N-dimethylformamide, dimethyl sulfoxide, N-methylpyrrolidone and tetrahydrofuran. Thus, the use of any of these solvents and additives with the resists of Aoai et al would have been prima facie obvious.

36. Claims 47-50, 52, 54-58, 60, 72, 73/47, 73/54, 74/47, 74/47, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/79/47, and 82/79/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Kodama et al (6,291,130 B1) cited by applicants). With respect to instant claims 47-50, 52, 54-58, 60, 72, 73/47, 73/54, 74/47, 74/47, 75/47, 75/54, 77/75/47, 77/75/54, 78/75/47, 78/75/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/79/47, and 82/79/54, the compositions in Tables 1, 2, 3, 4, 5, and 6 of P2, P3, P11,

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P12, P13, P14, P15, P17, P21 and P25 of Kodama et al are species which anticipate the instant compositions wherein $c=d=e=0$.

37. Claims 54-58, 60-61, 72/54-75/54, 77/75/54, 78/75/54, 80/54, 81/54, and 82/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Ushirogouchi et al (6,440,636 B1 cited by applicants). With respect to instant claims 54-58, 60-61, 72/54-75/54, 77/75/54, 78/75/54, 80/54, 81/54, and 82/54, Examples 20, 21 and Test Example of Ushirogouchi et al disclose compositions and resins which anticipate the instant compositions wherein $c=d=e=0$.

38. Claims 47-50, 52-58, 60-61, 72, 73/54, 73/47, 74/54, 74/47, 75/47, 75/54, 77/75/47, 77/75/54, 78/47, 78/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54 are rejected under 35 U.S.C. 102(a or e) as being anticipated by Sato et al (6,479,211, B1). With respect to instant claims 47-50, 52-58, 60-61, 72, 73/54, 73/47, 74/54, 74/47, 75/47, 74/54, 77/75/47, 77/75/54, 78/47, 78/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54. The resins of col. 104-106 of Sato et al anticipate the instant compositions wherein they are added to a photoacid generator, surfactant, organic basic compound and solved in propylene glycol monomethyl ether acetate as set forth in col. 106, lines 55 to col. 107. The examiner notes that Sato et al cited Table 3 but there was no Table 3 found by the examiner in Sato et al.

39. Claims 47-50, 54-58, 72, 73/54, 73/47, 74/54, 74/47, 75/47, 75/54, 78/47, 78/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaimoto et al (6,120,977). With respect to instant claims 47-50, 54-58, 72, 73/54, 73/47, 74/54, 74/47, 75/47, 75/54, 78/47, 78/54, 79/47, 79/54, 80/47, 80/54, 81/47, 81/54, 82/47 and 82/54, the compositions of Examples 1 and 2 of Kaimoto et al disclose a species of composition which anticipates the instant genus of compositions wherein $c=d=e=0$, the solvent is

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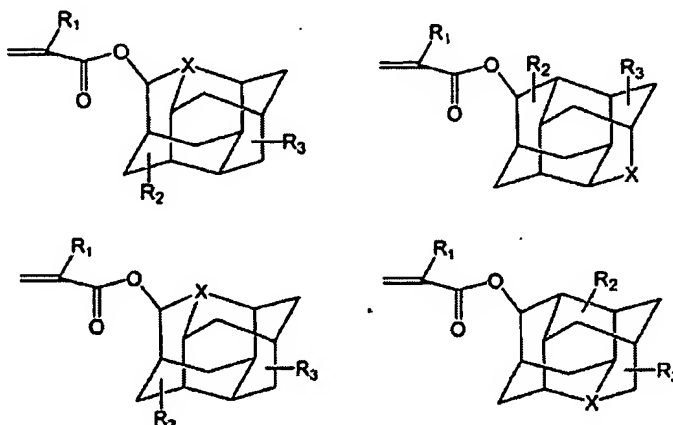
cyclohexanone, the photoacid generator is triphenylsulfonium hexafluoroantimonate and the the diphenylsulfone of formula (4) as bleaching agent is the compound promoting solubility in a developing solution or dye.

40. Claims 70 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al (US 2003/0008241 A1). With respect to claims 70 and 72, Example I-9 of Sato et al as identified in Table 1-3 on page 97 anticipates the instant compositions wherein (9) on page 91 shows a heterodiamondoid compound as the fourth mer in the resin used. The examiner has assumed that a heterodiamondoid is inclusive of such a compound since it was made from a diamondoid and there is no other definition save that of claim 71 as to what is a heterodiamodoid. The examiner also notes that diamondoid used here apparently includes diamantyl groups with hetero atoms as found in claim 71.

41. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori et al (2003/0134225 A1). The resins of (IIIA) wherein adamantyl groups with optional oxygen atom substitution as set forth in [0289] to [0294] is taught by Fujimori et al make prima facie obvious the instant photoresist compositions of applicant's claim 70. The group of compounds described is so small as to be prima facie obvious without further motivation. The enablement to make such resins is as great as that set forth by applicants in their specification.

42. Claim 71 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 71 is as follows:

71. The photoresist composition of claim 70, wherein the base resin is polymerized from any of the following monomers:



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wherein R_1 is selected from the group consisting of $-H$ and $-CH_3$;

R_2 is selected from the group consisting of $-H$, an alkyl group having from 1 to 4 carbon atoms, and an alkoxy group having from 1 to 4 carbon atoms;

R_3 is $-H$, or a hydrophilic-enhancing moiety selected from the group consisting of a hydroxyl group $-OH$, a keto group $=O$, carboxylic acid group $-COOH$, and alkoxy group $-OR_4$, and a group $-OC(O)OR_4$;

R_4 is $-CH_3$ or $-C_2H_5$;

X is selected from the group consisting of oxygen, nitrogen, boron, and sulfur.

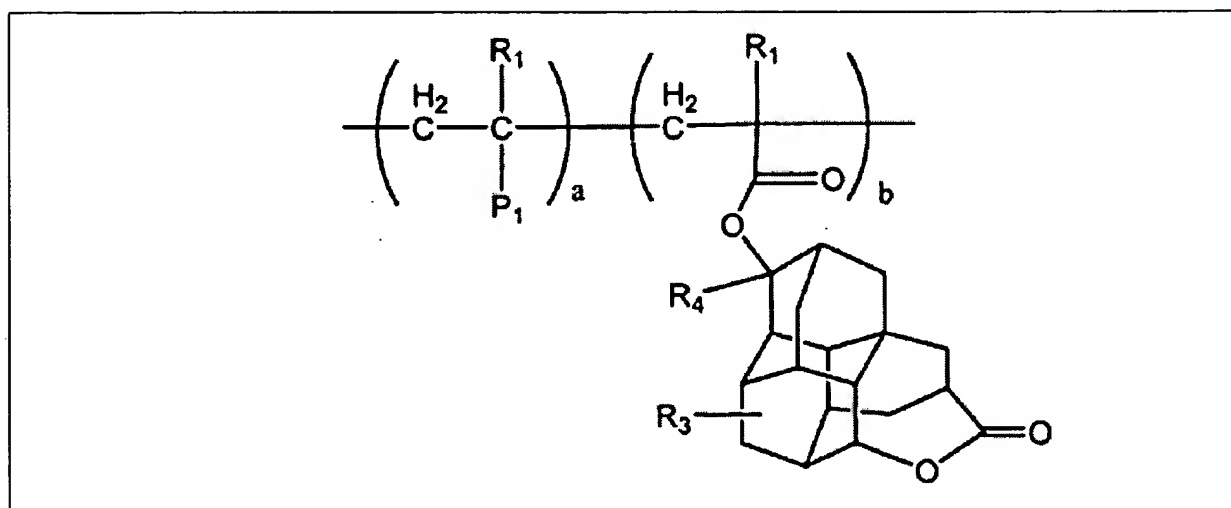
Claim 71 upon which it depends is as follows:

70. A positive-acting photoresist composition comprising a base resin having a heterodiamondoid as a pendant group.

The sole required member of the composition of claim 71 is the base resin described. The examiner found no indication within the specification or original claims as to how to make the diamantane like "heterodiamondoid" groups wherein X is oxygen, nitrogen, boron or sulfur. Since by applicant's own admission there is little or no art on the diamantane derivatives, the worker of ordinary skill in the art would not be aware of how to make the heterodiamondoids of

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claim 71 in order to make the base resin required for the composition. Thus, the original specification and claims are held non-enabling with respect to the ability to make the base resin required. The examiner notes that $X = C(=O)O^-$ as seen in claim 62 as shown below:



is not the same as $X=O$ and does not yield a diamondoid structure as found in claim 71 wherein X is one atom and one atom only in the ring structure. A showing of sufficient fact as to how the worker of ordinary skill in the art would know from the instant specification as well as the prior art how to make the base resins of claim 71 would remove this rejection.

43. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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44. Claims 43, 45-50, 52-58, 60-61, 72, 73/{43, 47, 54}, 74/{43, 47, 54}, 75/{43, 47, 54}, 77/75/{43, 47, 54}, 78/{43, 47, 54}, 79/{43, 47, 54}, 80/{43, 47, 54}, 81/{43, 47, 54} and 82/{43, 47, 54} are rejected under 35 U.S.C. 102(e) as being anticipated by Dammel (2005/0147915 A1). With respect to instant claims 43, 45-50, 52-58, 60-61, 72, 73/{43, 47, 54}, 74/{43, 47, 54}, 75/{43, 47, 54}, 77/75/{43, 47, 54}, 78/{43, 47, 54}, 79/{43, 47, 54}, 80/{43, 47, 54}, 81/{43, 47, 54} and 82/{43, 47, 54}, Examples 5-7 of Dammel present compositions which are species that anticipate the instant compositions. A rough comparison in table form is given below.

	Example 5			
monomer used		mole %		instant
2-methyl-2-adamantane methacrylate	MAdMa	40%	b adamantane	b
alpha-gamman butyrolactone methacrylate	GBLMA	35%	P	a
diamantane	mixture hydroxydiamantane methacrylates	25%	C diamantanes	c
additives	triphenylsulfonium nonafluorobutane sulfonate (TSP-Nf)		photoacid gen	2%
	diethanolamine		base	
	pgmea		solvent	
	Fc-443 surfactant			
claims				
43, 45-50, 52-58, 60-61, 72-75, 77-82				
Example 6				
	3-methyl-3diamantane methacrylate	40%		c
alpha-gamma butyrolactone methacrylate	GBLMA	35% p		a
hydroxyadamantane methacrylate	HAdMA	25%		b

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additives	triphenylsulfonium nonafluorobutane sulfonate (TSP-Nf)		photoacid	2%
	diethanolamine		base	
	pgmea		solvent	
	Fc-443 surfactant			
claims				
				103
43, 45-47, 49, 52-53, 54, 56-57, 60-61, 72, (73-75, 77-82)/43'47'54'				44
Example 7				
	3-methyl-3 diamantane methacrylate	40% c		
alpha-gamma butyrolactone methacrylate	GBLMA	35% a	p	
	isomeric hydroxydiamantane methacrylates	25% c		
claims				
43, 45-47, 49, 52-54, 56-57, 60-61, 72, (73-75, 77-82)/43'47'54'				

"A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989). The examiner found insufficient support for these instant claims in US Provisional application 60/508222 to meet the requirements of 35 USC 112, thus the effective filing date for all of the instant claims under rejection in this paragraph is January 23, 2004.

45. Claims 43-50, 52-66, 72/[43, 47, 54 or 62] to 82/[43, 47, 54 or 62] rejected under 35 U.S.C. 103(a) as being unpatentable over Dammel (US 2005/0147915 A1). Dammel teaches the instant invention wherein photoresist compositions set forth in Examples 1-3 teach all but the

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specific percentages of acid cleavable monomers, adamantanes, diamantanes, triamantanes and cyclic lactone triamantanes which are set forth in [0045]. However, the use of any of the acrylates or methacrylates formed from the triamantanes and diamantanes of Dammal's figures 1-9 would have been *prima facie* obvious in view of the teachings of Dammal et al to do so in the percentages set forth in [0070] wherein they are present in a most preferred range of 55 to 30 mole % as "higher adamantane containing monomers" with the rest being acid labile group monomers and others as set forth on pages 7-8. The additives for the photoresist are inclusive of the acid generating compounds set forth in [0072], the solvents set forth in [0073], the additives set forth in [0074-0075] as well as the examples of Dammal et al. Thus, the compositions of Dammal et al make *prima facie* obvious the instant compositions in the ranges of monomers set forth because In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Werthheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 UAPQ2d 1934 (Fed. Cir. 1990). See particularly MPEP 2144.05.

46. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yao et al (2005/0112494 A1) discloses in [0046] the use of diamondoids to make the polymers of [0011] for antireflective coating. The filing date of Yao et al is November 26, 2003. Fuji et al (US 2005/0100819 A1) has a filing date of September 30, 2004 and presents compositions that are like those of the instant application when adamantane monomers are used. Lau et al (WO 01/78110 A2) is drawn to the similar invention set forth in their priority document US 09/545,058 cited in [0022] of US 2002/0076543 A1 to diamantane compounds used as cage structures as the non-volatile component. Dahl et al (US 2002/0139295 A1) teach the obtaining

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of undecanantanes as of October 3, 2002. Liu et al (US 2004/0021204 A1) teach the formation of heteroatom-containing diamondoids and polymers thereof as novel with a filing date of July 16, 2003 and publication date of February 5, 2004. The inventive entity is the same as this application. Liu et al (2004/0059145) published March 25, 2004, and filed July 16, 2003 by the same inventive entity as this application is drawn to heterodiamondoids. Liu et al (2004/0109328) published June 10, 2004, and filed July 16, 2003 by the same inventive entity as this application discloses some heterodiamondoids. Dahl et al (US 2002/0193648 A1) teach the isolation of higher diamondoids along with their purification. The publication date is December 19, 2002 and the inventive entity is different than that of the current application. The same is true of Dahl et al (2002/0188163 A1) published December 12, 2002. The same is true of Dahl et al (2002/0147373 A1) published October 10, 2002. The same is true of Dahl et al (2002/01432217 A1) published October 3, 2002. The same is true of Dahl et al (US 2002/0143218 A1) published October 3, 2002. Dahl et al (2002/13434301 A1) teach the purification of pentamantanes and is clearly prior art with respect to the instant application because of the September 26, 2002 publication date. The same is true of Dahl et al (2002/037976 A1). Dahl et al (2002/0130407 A1) teach the addition of carboxyl groups to polymeric diamondoid nuclei as set forth in [0126] for adhesion purposes. Reference is made to copending application in [0074] as to derivatives of diamondoids that could be used to form the materials of Dahl et al (2002/0130407 A1). Dahl et al (WO 02/057202 A1) disclose methods for obtaining higher diamondoids and have a publication date of July 25, 2002. Liu et al (WO 03/050066 A1) teach functionalized higher diamondoids and is a different inventive entity than that of the instant application. Liu et al (WO 2004/009577 A1) teach the formation of

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heterodiamondoids and is a different inventive entity than that of the instant application. Shen (5,430,193) teach the formation of hydroxy ketone compounds from diamondoid lactones.

Oshima ((2002/0048725 A1 and 2002/0136987 A1) teach congressane being used in negative working photosensitive lithographic printing plate compositions.

47. The information disclosure statement filed October 15, 2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the reference 2003/0123010 does not match the date, inventor or classification given. Thus, this citation was not identified as required for consideration. It has been crossed out as the examiner could not determine what reference was to be considered. The second citation of 2002/0016516 was crossed out as redundant.

48. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Hamilton whose telephone number is 571-272-1331. The examiner can normally be reached on Monday through Friday 9:30 am to 5:00 pm.

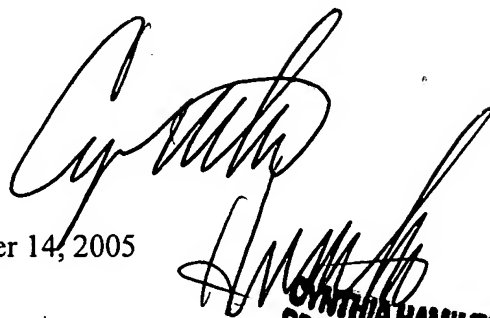
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on (571) 272-0729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A large, stylized handwritten signature in black ink, likely belonging to Cynthia Hamilton, is written over the date and stamp.

September 14, 2005

Cynthia Hamilton
Primary Examiner
Art Unit 1752

**CYNTHIA HAMILTON
PRIMARY EXAMINER**